National Aeronautics and
Space Administration

**Lyndon B. Johnson Space Center**
2101 NASA Parkway
Houston, Texas 77058-3696

November 30, 2009

Reply to Attn of: EA3-09-031

TO: AMS Records

FROM: EA3/NASA AMS Project Manager

SUBJECT: AMS Safety Verification Log

Thank you for the delivery of your Acceptance Data Package (ADP) for the Alpha Magnetic Spectrometer (AMS), in accordance with letter EA-06-043, updated in EA-07-045.

AMS is in the final stages of its flight certification. As part of the flight certification process at NASA, a Safety Verification Log (SVL) is tracked by the project and safety community until closure of these items. All of the items listed in the SVL are required to be closed prior to the NASA Phase III Safety Review, deeming the hardware safe for flight.

In reviewing the delivered ADP's, we could not verify all of the safety verifications from each of the numerous AMS detectors and sub-systems. In order to simplify the closure of these safety verifications, we are requesting that all hardware providers confirm that the delivered AMS flight hardware meet the generic safety criteria listed below:

1) All AMS hardware was delivered was manufactured and assembled per approved drawings and procedures, including tooling control used for manufacturing and assembly.
2) All hardware delivered that is capable of releasing a mass of 0.25 lbs. (113.4 grams) or larger due to fastener(s) failure has been attached with #8 or larger fasteners. (Ref: AMS-02-F01)
3) All safety-critical fasteners contained in components implement locking features that prevent inadvertent back-off (e.g., locking inserts/nuts, self-locking screws/bolts, safety wire or fastener preload/torque). (Ref: AMS-02-F01)

Note: The following 2 safety verifications are for special cases.

4) For applications where small fasteners were used that utilized chemical thread lock (e.g. "Loctite", "Vibratite") to prevent back-out, fasteners are contained within the structure of the AMS-02 Payload or its sub-elements. Note: This controls the potential release of mass while on the ISS truss. (Ref: AMS-02-F01)

JvE

5) In limited applications small fasteners capable of being released, and not contained by AMS-02 Structures or its sub-elements, and too small to utilize approved back-out prevention methodologies have implemented a potting/embedding of the fastener head within an epoxy (type) compound to contain the fastener. This implementation requires complete encapsulation of the fastener head (and/or nut where applicable) in a space qualified adhesive material. (Ref: AMS-02-F01)

Please provide your confirmation per the signature page attached, via fax (281) 244-0111 by December 11, 2009.

Trent D. Martin



JE

In accordance with letter EA-06-043, updated in EA-07-045 please signify by signing below that all hardware providers as listed hereby confirm that the delivered AMS flight hardware meet the generic safety criteria listed in the letter EA-09-031:

RWTH/Stephen Schael
TRD

MIT/ Thorsten Siedenburg
TRD Gas

University of Geneva/Divic Rapin
Tracker

RWTH/Thomas Kirn
ACC

INFN/Franco Cervelli
ECAL

MIT/Mike Capell
Magnet & Warm Helium, CDD, CPVS, BSE

GSFC/Stuart Banks
Cryocoolers

CRISA/Hermilio Cuesta
Cryo. Avionics Box

Yardney Lithian/Rob Gitzendanner
UPS

MIT/Mark Gallilee
Warm Valve

CGS/Massimilliano Olivier
TCS Radiators, TCS MLI

CIEMAT/Carlos Diaz
RICH

CARSO/Paolo Trampus
Star Tracker

CNRS/Claude Zurbach
GPS

01/12/2009

INFN/Giovanni Ambrosi
Electronics Crates

NLR/Johannes van Es
TTCS